WE CLAIM

1. A method for forwarding variable length packets across a multiport switch,
5   the method comprising the steps of:

       checking, at each time slot, forwarding requests to forward variable length
packets from source ports of the multiport switch to destination ports of the
multiport switch, wherein ignoring forwarding requests from source ports that
were previously scheduled to forward at least a portion of a variable length
10   packet during a next time slot and ignoring forwarding requests from destination
ports that are scheduled to receive at least a portion of a variable length packet
during the next time slot;

       selecting selected forwarding requests out of the checked forwarding
requests; and

15   configuring the multiport switch for allowing to service the selected
forwarding requests during the next time slot.

2. The method of claim 1 further comprises a step of tracking the forwarding
of each variable length packet across the multiport switch to determine whether
20   the forwarding ends during the current time slot.

3. The method of claim 1 further comprises a step of notifying source ports
that issued selected forwarding requests about the selection.

25   4. The method of claim 1 wherein the step of checking is preceded by a step
of receiving variable length packets at a source port, storing the variable length
packets at a queue out of at least one queue of the source port, wherein the
forwarding request reflects at least a portion of the content of the queue.

30   5. The method of claim 4 further comprises a step of maintaining at each
source port a queue for each level of priority of each source port, and a step of

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storing a variable length packet according to the priority of the variable length packet.

6.   The method of claim 4 further comprises a step of maintaining at each
5   source port a queue for each destination port, and a step of storing a variable length packet according to the destination port of the variable length packet.

7.   The method of claim 1 further comprises a step of periodically tracking the
10   forwarding of variable length packets to determine when the forwarding of the variable length packets ends.

8.   The method of claim 7 wherein the step of tracking comprises a step of receiving a length indication being indicative of a length of a variable length
15   packet and of a step of updating the length indication during the forwarding of the variable length packet to reflect a remaining time period until the forwarding ends.

9.   The method of claim 1 wherein the step of selecting further comprises a
20   step of converging on a conflict free match.

10.   The method of claim 1 wherein the step of selecting is based upon a rotating priority arbitration scheme.

25   11.   A method for controlling a crossbar switch having multiple ports, the method comprising the steps of:
        periodically checking connection requests, each connection request requesting to couple a destination port of the crossbar switch to a source port of the crossbar switch, for forwarding a variable length packet from the source port
30   to the destination port; wherein ignoring connection requests associated with each source port and destination port that is coupled to another destination port

and another source port accordingly during a current time slot for forwarding at least a portion of a variable length packet, wherein the forwarding of the variable length packet is not scheduled to end during the current time slot;

   processing the checked connection requests to determine the connectivity
5 of the crossbar switch during the next time slot; and

   providing control signals to the crossbar switch in view of the determination.

12.   The method of claim 11 further comprises a step of maintaining a crossbar
10 switch status database indicative of the connectivity of the crossbar switch during at least the current time slot and the next time slot.

13.   The method of claim 11 further comprises a step of receiving an END signal being indicative that a forwarding of a variable length packet is scheduled
15 to end during the current time slot.

14.   The method of claim 11 wherein the END signal is encoded in the connection requests.

20 15.   The method of claim 11 wherein maintaining a connection between a source port and a destination port throughout the forwarding of the variable length packet.

16.   The method of claim 11 wherein the step of processing the connection
25 requests further comprises a step of converging on a conflict free match.

17.   The method of claim 11 wherein the step of processing the connection requests is based upon a rotating priority arbitration scheme.

30 18.   A method for periodically controlling the flow of variable length packets across a multiport switch, the method comprising the steps of:

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scanning, at each time slot, for connection requests that are associated with source ports and to destination ports that are not scheduled to be busy during the next time slot;

selecting a granted connection request, for each destination port that is

5   associated with a scanned connection request;

selecting an accepted connection request, for each source port that is associated with a granted connection request; and

allowing variable length packets to flow across the multiport switch according to the accepted connection requests.

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19.   The method of claim 18 wherein maintaining a connection between a source port and a destination port throughout the flow of the variable length packet.

15   20.   The method of claim 18 wherein the steps of selecting further comprise a step of converging on a conflict free match in multiple iterations.

21.   The method of claim 18 wherein the steps of selecting are based upon a rotating priority arbitration scheme.

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22.   A method for controlling a configuration of a multiport switch for allowing variable length packets to flow from an input port to at least one output port of the multiport switch, the method comprising the steps of:

scanning, at each time slot, a content of input queues within the input

25   ports and generating flow requests for allowing variable length packet stored within the input queues to flow from input ports that were not previously scheduled to be busy during the next time slot to output ports that were not previously scheduled to be busy during the next time slot;

comparing flow requests and selecting selected flow requests to be

30   serviced during the next time slot; and

updating the configuration of the configurable multiport switch for allowing to service the selected flow requests.

23.   The method of claim 22 wherein each input port maintains a plurality of input queues, for differentiating between variable length packets according to at least one parameter selected from the group of :

variable length packet priority;

output port;

number of output ports to which the variable length packet is destined;

type of flow.

24.   The method of claim 22 wherein maintaining a connection between a source port and a destination port throughout the flow of the variable length packet.

25.   The method of claim 22 wherein the step of selecting further comprises a step of converging on a conflict free match in multiple iterations.

26.   The method of claim 22 wherein the step of selecting is based upon a rotating priority arbitration scheme.

27.   A multiport configurable switch for switching variable length packets, the switch comprising:

a plurality of input ports;

a plurality of output ports;

a configurable switching unit, coupled to the plurality of input ports and output ports, responsive to configuration signals for allowing to couple an input port with an output port;

a connection request generator, coupled to the input ports, for detecting awaiting variable length packets within the input ports, for determining the output

ports associated to the awaiting variable length packets and generating connection requests reflecting the determination; and

a scheduler, coupled to the connection request generator, to the plurality of programmable switching means, wherein the scheduler

5   (i)   receives the connection requests;

(ii)   periodically selects out of the received connection requests selected connection requests, each selected connection request for switching a variable length packet from an input port to an output port wherein both the input port and the output port were not

10   previously scheduled to be busy during the next time slot;

(iii)   provides the configurable switching unit configuration signals such that the selected connection requests are serviced during the next time slot; and

(iv)   notifying the input ports which connection requests are scheduled

15   to be serviced during the next time slot.

28.   The multiport switch of claim 27 wherein the scheduler stores status information representative of input ports and output ports that are busy during the current time slot and which input ports and output ports are scheduled to be busy

20 during the next time slot.

29.   The multiport switch of claim 27 wherein each input port comprises of a plurality of input queues, for differentiating between variable length packets according to at least one parameter selected from the group of :

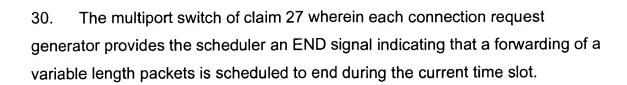25   variable length packet priority;

output port;

number of output ports to which the variable length packet is destined;

type of flow.

30.   The multiport switch of claim 27 wherein each connection request generator provides the scheduler an END signal indicating that a forwarding of a variable length packets is scheduled to end during the current time slot.

5   31.   The multiport switch of claim 27 wherein the scheduler selects by converging on a conflict free match.

32.   The multiport switch of claim 27 wherein the scheduler selections are based upon a rotating priority arbitration scheme.

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33.   A multiport switch for switching variable length packets, the switch comprising:

a plurality of input ports and output ports; wherein each input port

(i)   receives a variable length packet;

15   (ii)   determines an output port associated to the variable length packet;

(iii)   generates a connection request for forwarding the variable length packet from the input port to the output port;

(iv)   tracks a provision of the variable length packet to a

20   plurality of programmable switching units to detect that a transmission of a variable length packet across the crossbar ends during a current time slot, and accordingly sends an END signal;

a configurable switching unit, coupled to the plurality of input ports and output ports, responsive to configuration signals, for allowing to couple an input

25   port with an output port; and

a scheduler, coupled to the connection request generator, to the plurality of programmable switching means and to the input ports, wherein the scheduler
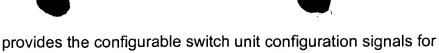
(i)   receives the connection requests and the END signals;

(ii)   periodically selects a configuration of the configurable switching

30   units based upon these signals;

(iii) provides the configurable switch unit configuration signals for allowing to service the selected connection requests; and

(iv) notifies the input ports which connection requests are scheduled to be serviced during the next time slot.

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34. The multiport switch of claim 33 wherein each input port further comprises a plurality of queues and a queuing manager; wherein the queuing manager is adapted to receive a variable length packet, to determine in which queue out of the plurality of queues of the input port to store the received variable length

10 packet and to generate a length indication indicating a length of the variable length packet.

35. A scheduler for scheduling a configurable switching unit, the scheduler receives a connection request for forwarding a variable length packet from an

15 input port to the output port of the multiport switch;

wherein the scheduler periodically selects out of the received connection requests selected connection requests, each selected connection request for switching a variable length packet from an input port to an output port wherein both the input port and the output port were not previously scheduled to be busy

20 during the next time slot; and

wherein the scheduler provides the configurable switching unit configuration signals such that the selected connection requests are serviced during the next time slot.

25 36. The scheduler of claim 35 wherein the scheduler selects by converging on a conflict free match in multiple iterations.

37. The scheduler of claim 35 wherein the scheduler selections are based upon a rotating priority arbitration scheme.

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